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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/706,090

11/13/2003

Junji Sugamoto

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7590

03/23/2005

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EXAMINER

LEE, GRANVILL D

ART UNIT

PAPER NUMBER

2891

DATE MAILED: 03/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/706,090

Applicant(s)

SUGAMOTO ET AL.

Examiner

Granvill D. Lee, Jr

Art Unit

2825

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 6 and 8-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6, 14 and 32-34 is/are allowed.
- 6) ☒ Claim(s) 8-13, 15-16, 22-29 & 31 is/are rejected.
- 7) ☒ Claim(s) 17-21, 28 and 30 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### **Claim Objections**

Claims 9 and 26 are objected to because of the following informalities: The phrases "without cleavage" and "without being cleaved", are not disclosed in the specification. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 26, 27 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Younan (Article V) in view of In re Aller.

In view of these claims (esp. clm. 26), Younan treats a semiconductor wafer comprising, treating the semiconductor wafer (Abstr.) in a second solution called Wright etch, which includes at least one kind of an oxidative acid (HF) and an alkali agent (HNO<sub>3</sub>), and treating the semiconductor wafer in a first solution including at least one of HF and NH<sub>4</sub>F for 15 minutes (intro.), but fails to point out a solution where the concentration is less than 49%. It would have been obvious to

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one having ordinary skill in the art at the time the invention was made to consider less than 49% concentration, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

In further view of claim 26, Younan discloses an in-test fabrication process where an apparatus is used wherein a first device to remove with a chemical solution a film of a semiconductor wafer which may have a crystal defect, so as to expose a crystal surface of the semiconductor wafer: said film constituting a capacitor device structure including a device pattern; and a second device to selectively remove a surface layer of the semiconductor wafer by selective etching to bring the crystal defect into view (Abstr.). (Note, that the apparatus used is a fabrication process, which consists of some mechanism used to move and soak the wafers to be etched, as instant application fails to detail apparatus structure.)

In view of claim 27, Younan (Art. V) uses a third etch step for 5 minutes (Pg. 188 col. 2, 3<sup>rd</sup> para.).

In view of claim 29 Younan (Art. V) uses two inspection steps using an optical inspection followed by a SEM inspection (Sect. III and fig. 2-4).

Claims 8-13, 15 and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Younan (Article U).

In view of these claims, Younan treats a semiconductor wafer comprising, treating the semiconductor wafer (Abstr.) in a second solution called Wright etch, which includes at least one kind of an oxidative acid (HF) and an alkali agent (HNO<sub>3</sub>), and treating the semiconductor wafer in a first solution including at least one of HF and NH<sub>4</sub>F for 15 minutes (intro.). In view of claim 8, Younan discusses treating the wafer in a first solution of 49% HF, followed by an acid and HF solution (pg. 21 col. 1 last para.-col. 2 third para.).

In view of claims 9 and 23, Younan shows method of inspecting a semiconductor wafer which comprises a film constituting a device structure including a device pattern and which may have a crystal defect, the method comprising, removing said film with a chemical solution to expose the crystal surface of the semiconductor wafer, selectively removing a surface layer or the semiconductor wafer by selective etching to bring the crystal defect into view; and quantitatively evaluating the crystal defect (Abstr.). Younan further integrates the process and determines the causes of low-yielding manufacturing processes (pg. 22 col. 2 para. 2-5).

In view of claims 10-11 and 24, Younan further shows a chemical solution including a second solution having at least one kind of an oxidative acid and an oxidizing agent and a first solution having at least one of HF (pg. 20 Col. 2 para. 1-3).

In view of claims 12-13, 22 and 25, Younan continues with a process to reduce the residues with an agitated solution of the Wright etch solution, (pg. 21 col. 2 last para) this must be done so as to proper analysis by SEM.

In view of claim 15, Younan uses a Wright etch solution of an oxidative hydrofluoric acid and a potassium dichromate oxidizing agent (pg. 20 col. 2 para. 1-3).

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Younan (Art. U) in view of Yasuo (Japan. Doc.11-054579).

In view of this claim, Younan shows method of inspecting a semiconductor wafer which comprises a film constituting a device structure including a device pattern and which may have a crystal defect, the method comprising, removing said film with a chemical solution to expose the crystal surface of the semiconductor wafer, selectively removing a surface layer or the semiconductor wafer by selective etching to bring the crystal defect into view; and quantitatively evaluating the crystal defect. But Younan analysis does not take into account creating a defect free pattern on the wafer to compare to the defective one as a reference.

Yasuo invents a method where a defect-free layer in a sample is created and used to compare to a sample with defects. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the

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invention to modify the Wright etch method of Younan with the substrate evaluation method of Yasuo to achieve better comparative results, since the crystals with defects are observed to create pits when etched and contrast well with those without the defects (Para. 0001-0006).

Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Younan (Art. V) in view of Younan (Art. U).

In view of this claim, Younan (Art. V) shows method of inspecting a semiconductor wafer which comprises a film constituting a device structure including a device pattern and which may have a crystal defect, the method comprising, removing said film with a chemical solution to expose the crystal surface of the semiconductor wafer, selectively removing a surface layer or the semiconductor wafer by selective etching to bring the crystal defect into view, but fails to an ultrasonic wave generator to apply to the semiconductor. But, Younan (Art. U) continues with a process to reduce the residues with an agitated solution of the Wright etch (pg. 21 col. 2 last para). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the Wright etch method of Younan (Art. V) to the agitated method of Younan (Art. U) In order achieve a cleaner sample, since it was desirable that bubbles or other by products should not remain on the surface (pg. 21 last para.- pg. 22 1<sup>st</sup> para.).

***Allowable Subject Matter***

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Claims 6, 14 and 32-34 are allowable.

Claims 17- 21, 28 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Final Action***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP 706.07(a). Applicant is reminded of the extension of time policy as set forth in CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications for the examiner should be directed to Granvill Lee whose telephone number is (571) 272-1897. The examiner can be normally reached on Monday thru Friday from 8:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are not successful, the examiner's supervisor, Bill Beumeister can be reached on (571) 272-1722. The fax phone number for this group is (703) 872-9306.

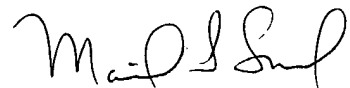


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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Examiner  
Granvill Lee  
Art Unit 2825

GI  
3/20/05



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